

SMS Rule Revisions - Human Health and Background Issues Summary of Advisory Group Feedback April 2010

Ecology has conducted advisory groups meetings for both the Sediment Workgroup and MTCA/SMS Advisory Group from November 2009 through March 2010. Two issues are of particular interest to both groups and have been primary topics at the majority of meetings. These include 1) protection of human health and 2) how to address background concentrations of bioaccumulative or ubiquitous chemicals when setting sediment cleanup standards and selecting cleanup remedies.

This document is a summary of what we have consistently heard from both groups captured in the format of a potential framework that includes additional questions that need further examination and discussion. The intent of this document is to provide a tool for further productive discussion in order to move the groups towards completing recommendations to Ecology. The outlined framework does not indicate a decision by Ecology; but rather a synthesis of our deliberations as a group.

General Guiding Concepts

Ecology has consistently heard from both advisory groups that the following concepts should influence Ecology's decision making for rule revisions regarding the issues of Human Health and Background.

- **Protection.** The rule revisions should result in a decision-making process that results in steady progress on addressing human health and environmental risks. The decision-making process may need to include short- and long-term protection goals.
- **Source Control:** This tool is an integral part of sustaining a cleanup. Cleanup is an important and productive first step towards reducing risk to humans and the environment. However, many types of source control measures, conducted in an integrated fashion with cleanup, will be needed to achieve sustainable remediation at concentrations below current background.
- **Feasibility:** The rule revisions/decision-making process should take into account the technical feasibility of achieving and maintaining low cleanup standards. Tools that the group thought showed some promise and deserve further examination include:
 - Hot Spot/High Concentration Area Cleanup: Defining units within a larger site (such as a river stretch/embayment/watershed) and conduct hot spot cleanup. This could significantly reduce risk, reduce potential for recontamination of other areas within the

larger site, and contribute to an overall decrease in Regional or Natural Background concentrations.

- Partial Settlements: Use to resolve PLP liability for hot spot “units” that are physically remediated (dredge, cap, combination).
 - Monitored Natural Recovery: Use to address the larger site (embayment/watershed/river stretch). PLP’s would be liable for their contribution to the larger site (joint and several applies) and would be collectively responsible for monitoring to ensure background concentrations are decreasing.
- **Balancing Predictability and Flexibility.** The rule revisions should establish a predictable decision-making process that provides the flexibility to consider site-specific differences.
 - **Clear Definitions:** Ensure the definition for background (Regional or Natural) is clear and details how it should be calculated. Ideas of how to refine the definition of background centered around:
 - Regional Background: Watershed or embayment scale.
 - Natural Background: Puget Sound wide or multi watershed scale.
 - **Liability Resolution:** Ability to resolve PLP liability for cleanup sites to provide incentive to get cleanup done.
 - **Simplicity.** Keep the process as simple as possible. The guiding premise behind the rule revisions was to clarify processes and harmonize the SMS and MTCA. If the rule revisions make cleanup more complicated this will defeat the purpose and could likely slow down cleanup.

Potential Decision Making Framework

Sustainable remediation of contaminated sediment will require a combination of actions over both a short and long term time frame:

- Active cleanup measures (e.g., dredging, capping).
- Source control measures (e.g., end-of-pipe controls, land use modifications, process changes, measures to prevent the production or use of hazardous substances).
- Natural recovery processes (e.g., sedimentation/burial, biodegradation).

Cleanup decision-making could be structured around short term and long term goals that reflect differences in time and geographic scale. See Figure 1.

- Short Term Goals:
 - There are important environmental benefits associated with early remediation of highly contaminated sediments or “hot spots”.
 - Short term cleanup goals for individual hot spots with a cleanup standard based on Regional Background to be met after cleanup construction.
 - This short term goal would require active cleanup measures (dredging, capping) and PLP source control.
- Long Term Goals:
 - These are more conservative goals based on Natural Background on an embayment/river/watershed scale and would be attained over a period of decades.
 - This paradigm is somewhat similar to the current SMS rule where a CSL cleanup standard should be met after cleanup construction (or within 10 years) and the SQS is the long term goal of the sediment ecosystem.
 - Source control measures and monitored natural recovery would be the primary tools for achieving further reductions in sediment concentrations.
 - This long term goal would require baywide/watershed scale PLP natural recovery monitoring, source control, and residual sediment cleanup.

Use a multi prong strategy to accomplish short term and long term goals that focus on three concepts (see Figures 1 and 2):

- 1) Background concentration cleanup standards or remediation levels for hot spot cleanup.
- 2) Baywide or watershed integrated source control.
- 3) Baywide or watershed monitored natural recovery.

- 1) Background cleanup standards or remediation levels for hot spot cleanup.
 - a. Short term goal would be a cleanup standard (or remediation level) set at Regional Background or the level recontamination based on regional sources not from the PLP.

- b. Hot spot “Units” within the larger site (embayment/river/watershed) would be defined by Regional Background and the chemical footprint.
 - c. These hot spot units would be actively remediated (dredging, capping) to reduce sediment concentrations to levels that can recover as source control measures are taken.
 - d. Decisions on active remediation will need to consider source control timelines and natural recovery.
 - e. All sources from the PLP are controlled so the site will not be recontaminated by the PLP above (Natural, Regional, Recontamination potential?) Background. This will contribute to the long term conservative embayment or watershed scale goal.
 - f. Hot spot “units” within the bay or watershed would be prioritized by human and ecological health risks. Subsequent prioritization would be conducted by the presence of viable PLP’s, source control requirements, and potential improvement to habitat.
 - g. If the site is recontaminated above (Natural, Regional, Recontamination potential?) Background, and the PLP source control efforts are a cause, further residual cleanup may be needed.
- 2) Baywide or watershed integrated source control.
- a. Varying levels of source control will be needed over a period of several decades independent of whether and when Ecology develops an effective overall source control strategy.
 - b. Source control of multiple NPDES permitted (stormwater, CSO’s, and Industrial and Municipal wastewater) and unpermitted sources (stormwater) are an integral part of any strategy to lower contaminant concentrations on a baywide or watershed scale.
 - c. There are varying levels of source control that are needed over a period of decades. This is independent of whether and when Ecology develops an overall source control strategy.
- 3) Baywide or watershed monitored natural recovery.
- a. Long term goal of Natural Background would be accomplished by setting the baywide or watershed cleanup goal at a lower, more conservative Natural Background level and include monitored natural recovery and source control.
 - b. Compliance monitoring will be needed to verify source control and natural recovery predictions, etc.
 - c. PLP, or multiple PLP’s, would contribute funds for baywide or watershed monitoring for natural recovery compliance monitoring.
 - d. Ecology must take an active role in the long term conservative cleanup goal of Natural Background by overseeing monitoring, requiring further residual cleanup actions where necessary, and overseeing PLP remedy and PLP source control effectiveness.

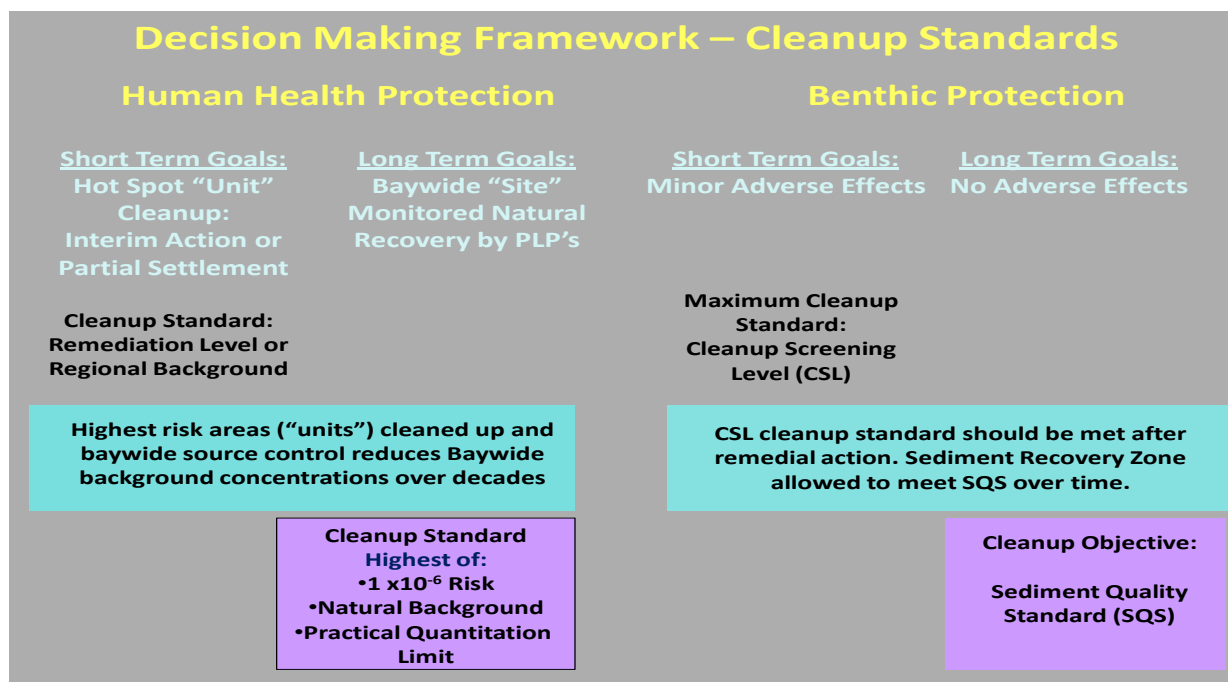


Figure 1. Decision making framework for setting cleanup standards when contamination from PLP’s is embayment, river, or watershed wide. The framework includes setting long term conservative goals for the entire site (such as an embayment) and short term goals for individual units delineated by areas of highest risk or “hot spots”.

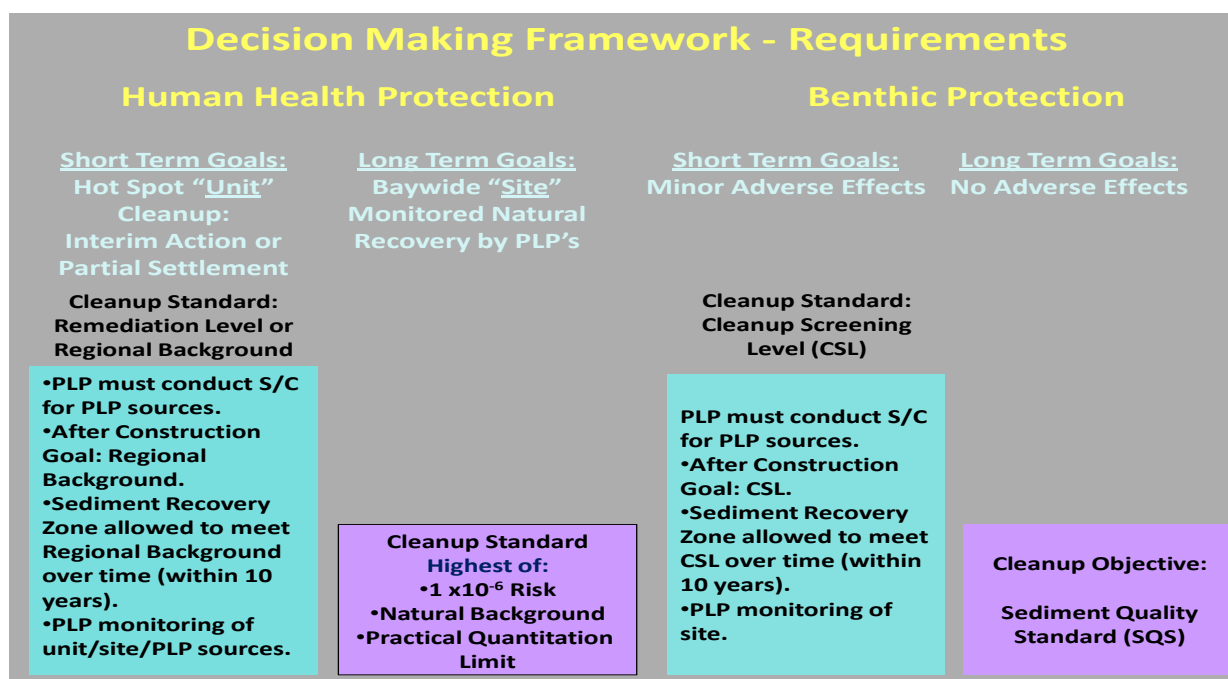


Figure 2. Meeting short term and long term cleanup goals. PLP must conduct and complete source control for all PLP sources for a partial settlement. Long term goals of Natural Background for the site would include baywide source control efforts to reduce loading. PLP would be required to contribute to baywide monitoring to verify Natural Recovery targets.

Hypothetical Scenarios

The Sediment Workgroup constructed several hypothetical scenarios to support discussions. These scenarios are attached to this paper. Please review these scenarios and the following questions as you review the potential decision-making framework described above.

1) **Recontamination:**

- a. How can a cleanup site achieve/maintain a Natural Background standard if it is recontaminated at Area Background by uncontrolled sources (stormwater, local atmospheric deposition, etc.)? This is a real possibility because cleanup sites are nearshore, and localized sources would be contributing (likely significantly) to Area Background concentrations.
- b. Should Area Background be the trigger for more cleanup if it is possible that the recontamination may be both from incoming sources and *in situ* sediment sources for which the PLP may have contributed pre cleanup?

2) **PLP Liability Resolution:**

- a. Should there be a process that allows a PLP to resolve their cleanup liability when they have remediated an area that is likely to become recontaminated from incoming sources (not from the PLP)?
- b. If so, what could that process look like?
- c. If a PLP is liable for the “hot spot” unit cleanup and has contributed to the mixed plume area (embayment), could a sediment recovery zone which is addressed by source control and long term monitoring by PLP be a workable solution?

3) **Technical feasibility:** How can this be used to provide the PLP with liability resolution while still keeping in mind the long term environmental goal (embayment/river/watershed) of meeting Natural Background?

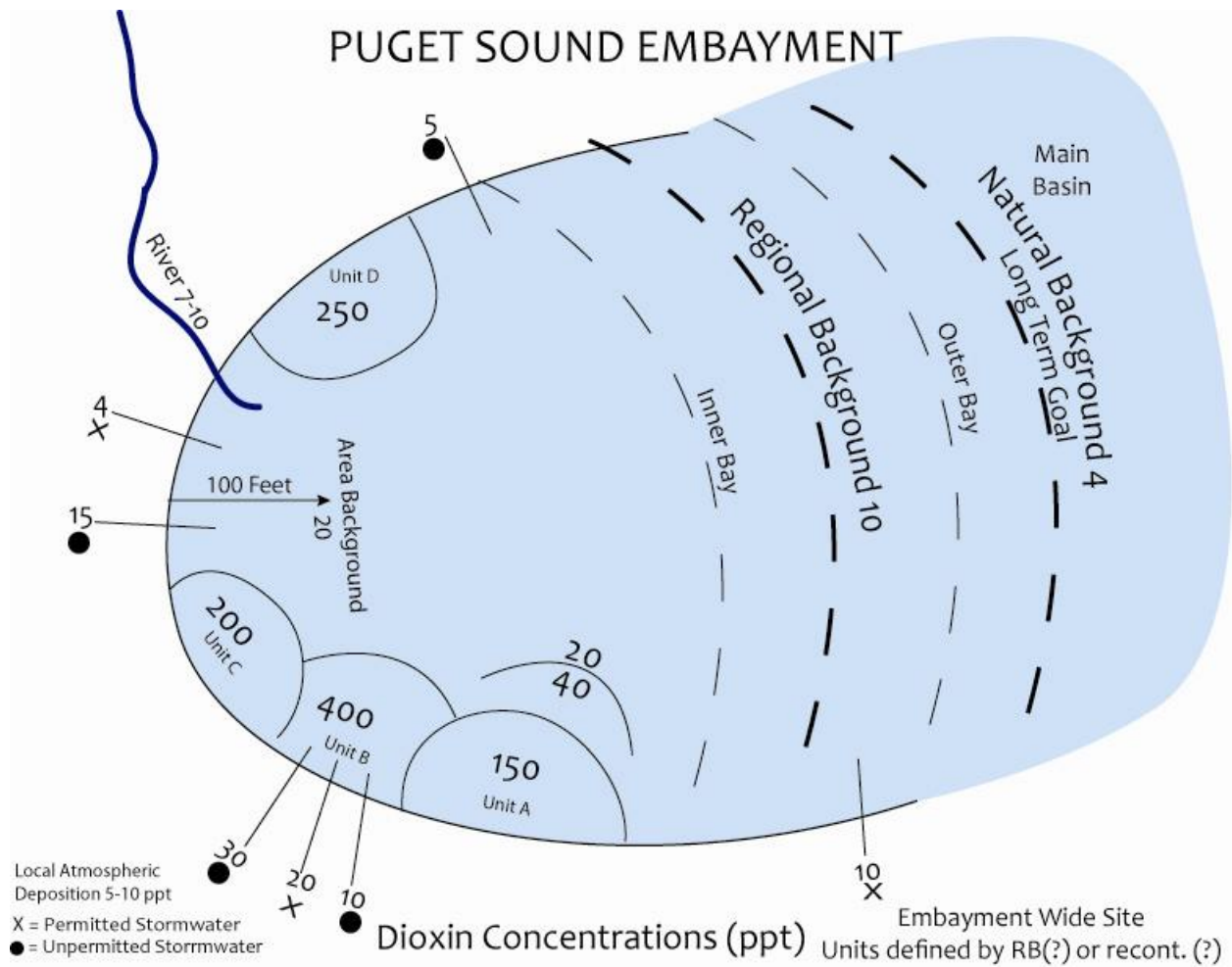
4) **Site Definition:** How would you recommend that we define a cleanup site, or a unit within an embayment wide site, when background is a cleanup standard? Possible ideas include:

- a. Define by areas above Regional Background because it is definable and can be attributed to one or more PLPs.
- b. Define a whole embayment or watershed as a site if it is above Natural Background.
- c. Define multiple sites or units within a larger embayment or watershed that encompasses areas exceeding Regional or Natural Background levels (e.g., operable unit concept).

5) **Regional Background:** There was some agreement on the idea of Regional Background being defined on a watershed/embayment scale.

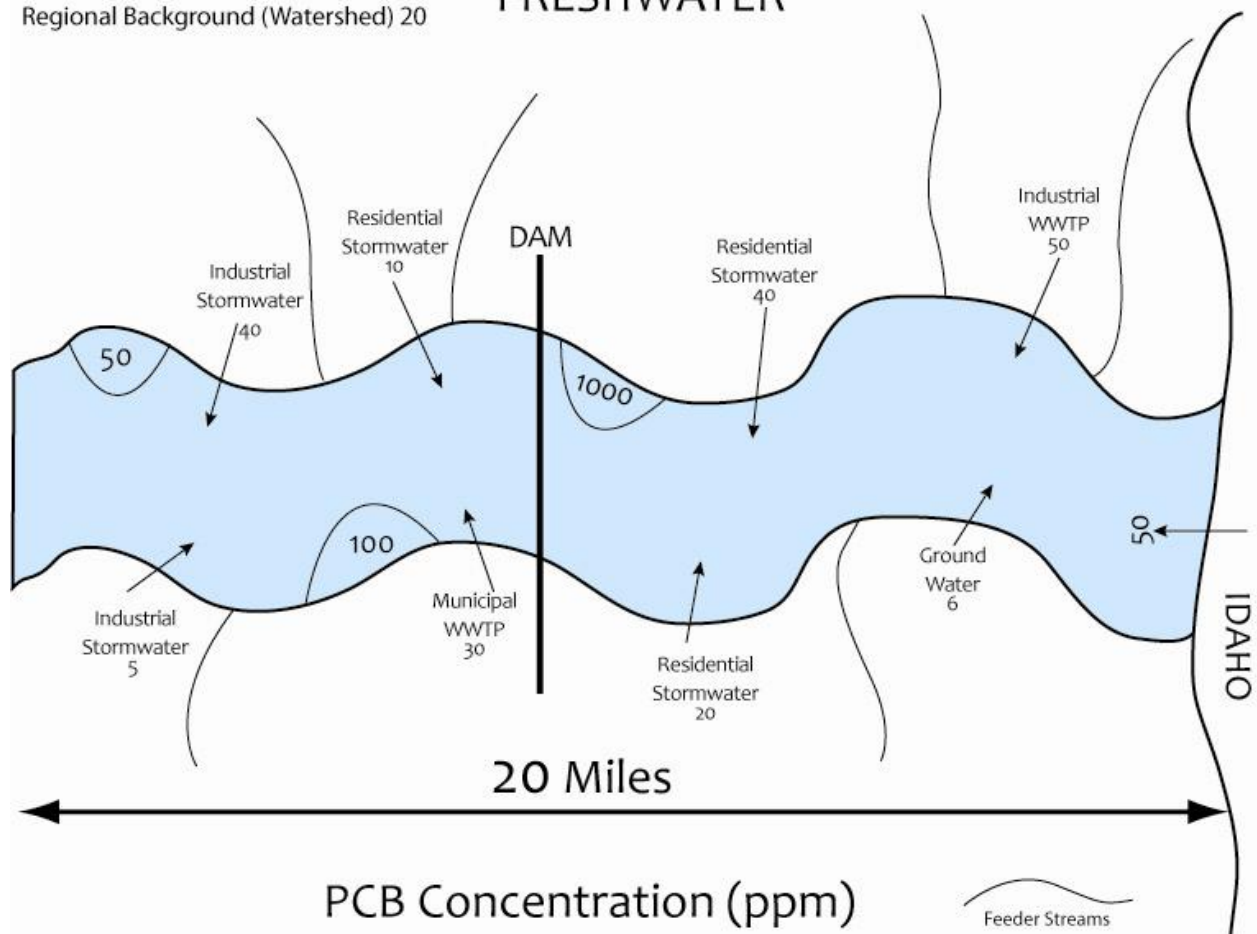
- a. How would an embayment scale definition work for Puget Sound?
- b. What would this mean for Puget Sound given that Regional Background embayment wide could be argued as “Area Background” for small embayments?
- c. If Regional Background is defined as larger than an embayment how could this be delineated?

- d. Would this be the background once cleanup is done and sources such as CSO's and stormwater are controlled? Or would it include uncontrolled CSO's and stormwater influences?
- e. How would we decide that stormwater is controlled? Or would we just look at improvement in stormwater, if contaminant concentrations have decreased overtime?
- f. How to include naturally occurring sources (sediment w/metals for example) vs. other sources (stormwater).

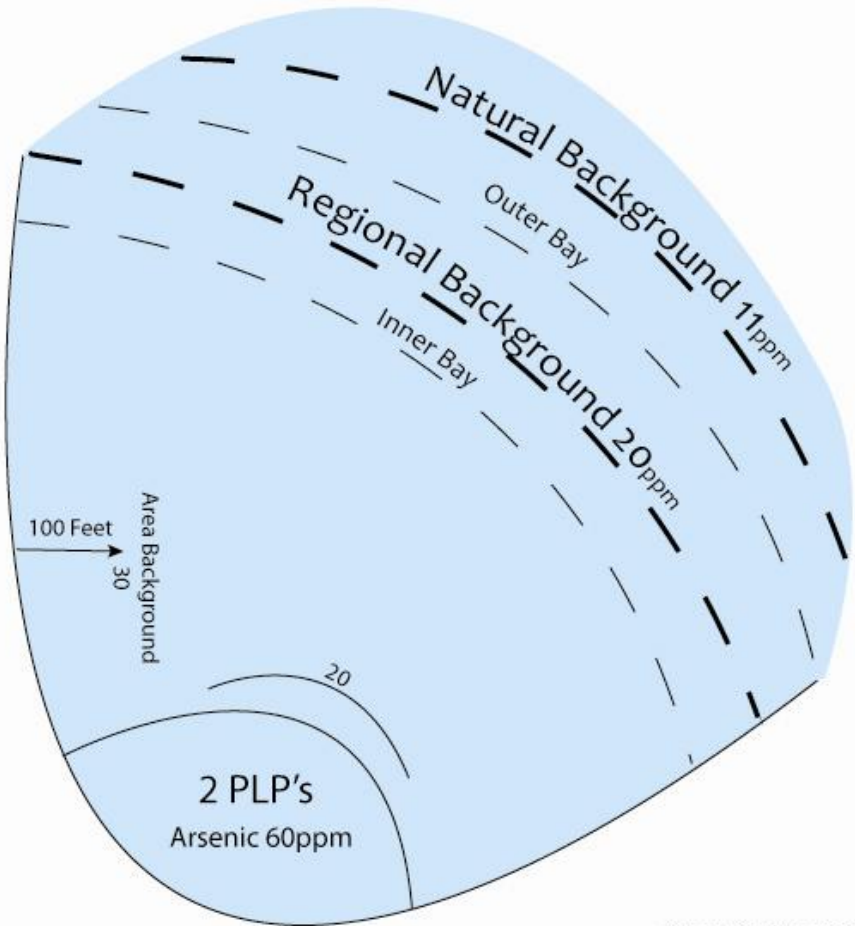


Natural Background (Reference Sites) 5
Regional Background (Watershed) 20

FRESHWATER



PUGET SOUND EMBAYMENT



Local Atmospheric
Deposition 5 ppm

Arsenic Sediment Concentrations